

1 exposure that we have is the recollection of the
2 individual as prompted by an attorney. And it is
3 clear that we cannot have the same kind of certainty
4 that we have with regard to measurements that we made
5 yesterday when we are talking about our guesses, and
6 they are guesses, rather than estimates, of what the
7 exposures were 40, 50, 60 years ago.

8 So, yes, your comments are entirely apt,
9 Dr. Corn, and I agree with them.

10 Now, having said that, I will say that
11 this technology that has been shown to us by the
12 other panelists here, the Monte Carlo methods, are
13 very useful in giving figures of merit from which one
14 can make reasonable assumptions about relative risks.
15 You just have to be awfully careful not to have too
16 many significant figures, and with asbestos
17 measurement, maybe one significant figure is about --
18 maybe two, sometimes, is about all you can hope for.
19 But I agree. But, these techniques will help to
20 focus and to make the argument more pointed.

21 BILL DYSON: I would certainly agree with
22 what you said, Mort, but I would point out that what
23 the opposite argument is is that every exposure is
24 significant and every exposure is contributory, and
25 that just isn't the case always, and we have to have

1 some type of methodology for sorting that out, and
2 the methodologies that have been presented here, at
3 least, are useful in getting us into the appropriate
4 ball game of sorting that out.

5 MORT CORN: What worries me is the
6 difference in the methodologies. It might be best if
7 we could set a standard for ourselves that where this
8 type of analysis is involved in a case, Plaintiffs
9 and defense experts must agree. I think for the
10 credibility of our field, if there could be one
11 assessment that both experts agree on, it would be
12 marvelous.

13 JIM RASMUSON: All models are wrong. Some
14 are useful, and I think when we can show many orders
15 of magnitude of differences, and I think as Dr. Corn
16 said, when we can be inclusive of both Plaintiff
17 experts and experts for the defense, to the extent
18 possible, I think all of that is going to help, but I
19 think, as I indicated in the talk, recognizing the
20 limitations of the methodology is just as important
21 as recognizing the strengths of the methodology.

22 (This concludes side 1. Please turn the
23 tape over for a continuation of the
24 presentation.)

25 ALLEN ROGERS: -- interesting in along as

1 what Mort said was that this great complicated Monte
2 Carlo and computer analysis really produces a number
3 which is very similar to cumulative exposure, very
4 similar if you just took the mean of the results
5 presented in the historical papers and then did your
6 proportion of time. I am sorry to go to all the
7 computer buffs and I am sorry to dispose of my son
8 who studied computer science at the university,
9 however, you get nothing -- it goes to another factor
10 that you really are getting not much out of a very
11 small number.

12 It is interesting to see most of the
13 information provided today related to about three, if
14 not at the most four scientific papers in the
15 international literature.

16 The stuff on the ladders was all Balzer
17 and Cooper. And everything that has been done and
18 through the courts, as far as I see, relies on some
19 short 10-minute samples done a number of times in one
20 particular work location.

21 And the same on many of the other types of
22 studies. The Harries study, you know, I have read
23 his thesis and everything else, but it is very small
24 amounts of numbers that people are making these
25 massive extrapolation to many millions of work --

1 potentially many millions of workers based on some
2 very short periods of exposure information.

3 The data that you plug into these models
4 and calculations is so limited that it makes the
5 variability in the final extrapolation near
6 impossible to determine its accuracy.

7 Thank you.

8 FRED BOELTER: I think your point is well
9 taken on that, and frankly there isn't that much data
10 out there historically pre 1970. There is a number
11 of reasons for that, it wasn't required to be
12 collected and it wasn't available, so there are a few
13 number of places to go to gather that information.

14 Your earlier point about using the mean
15 value is well taken. But my view on doing this type
16 of a dose reconstruction is really similar to a risk
17 process using a tiered system. In a tier one
18 analysis we can use default values, such as the
19 means, and determine whether that seems adequate to
20 answer the question that has been posed.

21 If that analysis on a tier one is not
22 sufficient, and we go to a tier two where we look at
23 more specific information, that might relate to the
24 activity or the event of interest. Absent that, we
25 can go to a tier three analysis and go through all

1 this process clearly.

2 This level of taking the work history and
3 a timeline and slicing up individual sections to
4 ultimately calculate a dose associated with each
5 event can't be done on (audiotape difficulties) and
6 trying to analogize it to the situation that we are
7 confronted with evaluating to ultimately opine about
8 the significance. It has its application not only in
9 litigation but also in nonlitigation, and it is a
10 fundamental process, as Dr. Corn pointed out, in
11 performing an epidemiologic study, but it is a
12 technique where when necessary we can get into the
13 information and try in some way to compile a
14 numerical value associated with a dose, a historic
15 dose, to determine its significance, generally in
16 comparison to something else.

17 (Audiotape difficulties)

18 JIM RASMUSON: The industrial hygienist
19 cannot be air monitoring every situation at all
20 times. An industrial hygienist by instinct uses
21 these techniques to try to prioritize exposures in
22 the workplace.

23 I think what we are trying to present here
24 is simply a formalized approach (audiotape
25 difficulties) only several, three or four literature

1 articles were the basis for this, literally thousands
2 in our database. As Dr. Boelter mentioned, it is
3 just a matter of time and for reasons of simplicity
4 (audiotape difficulties) at the time is almost beside
5 the point because what we are talking about is the
6 exposure assessment process, which really deals with
7 current exposures, future exposures. It is the
8 basis, for example, setting priorities for cleaning
9 up Superfund sites and so on, and if industrial
10 hygienists don't become more conscious of what they
11 are doing relative to exposure assessment, I think
12 the field will likewise suffer in the same manner as
13 if we try to attach too much significance to the work
14 we do as well.

15 FRED BOELTER: Thank you. I actually took
16 the comment about the literature as being the
17 published literature as opposed to the tremendous
18 amount of information that is available, the
19 unpublished literature.

20 JIM RASMUSON: That is right. And, of
21 course, there is a tremendous database of unpublished
22 literature that most of us have access to as well.

23 FRED BOELTER: There was another question?

24 MIKE MILLER: Mike Miller from the Navy
25 Environmental Health Center in Norfolk, Virginia.

1 ...I attended this session because we
2 frequently get inquiries from the Veterans
3 Administration about veterans who are filing
4 service-connected disability claims, and the question
5 goes sort of like this person was a fireman
6 apprentice on the USS whatever from the period of
7 1940 to 1942, can you comment on his exposures. And,
8 of course the answer to that is no.

9 So I was fascinated to see that you
10 somehow have attached some numbers to those exposures
11 and I am just curious as to, for instance, the
12 boiler, Navy boiler tender exposure of .1 fibers per
13 cc, where that number came from, because I am pretty
14 sure that at least within the Navy that data doesn't
15 exist and it was never collected.

16 You know, I am an industrial hygienist but
17 I am also the son of a World War II Navy veteran who
18 died way too young of lung cancer, so my sympathies
19 are, indeed, with these veterans who deserve every
20 penny if it is, indeed, a service-connected
21 disability, and I would love to be able to answer
22 these questions with some degree of certainty and
23 science, as Dr. Corn pointed out, but it just occurs
24 to me that the models are based on certain
25 assumptions being plugged in at the front end and,

1 not being a lawyer, but my supposition would be that
2 the assumptions are nothing more than speculation, so
3 the result at the other end of the equation can be
4 nothing more than speculation.

5 I am wondering what kind of legal veracity
6 it has in a courtroom or when filing a claim?

7 BILL DYSON: Well, obviously I do have a
8 basis for that number. There were a series of
9 studies done in the James River Reserve Fleet by
10 Illinois Institute of Technology that gave us a range
11 of numbers that went from .00X up through .3, and
12 don't get hung up on the fact that I am using a
13 single point estimate for this, that was just for
14 illustrative purposes. There are also a large series
15 of studies that have been done on commercial ships,
16 actual measurements that have been made, various
17 activities on commercial ships by several of the oil
18 companies; for example, and furthermore, there is
19 actual testimony before a congressional committee by
20 a representative of the Navy who used that very same
21 number, 0.1, saying that people had not been exposed
22 above that number.

23 So these numbers come from a wide variety
24 of sources, they are not pulled out of the air at
25 all..

1 JOHN SPENCER: I will also add I was
2 formally with the U.S. Coast Guard as their
3 industrial hygienist and we had a small shipyard
4 facility, albeit not the naval size shipyards, but my
5 role was also working with the medical people and the
6 occupational medical monitoring program, and then
7 also their workers' comp related issues, and we had a
8 lot of data in the Coast Guard, and I know the Navy,
9 I have done foyer requests from the Navy and gotten
10 similar data on various specific activities based --
11 and looking at trades and activities as to what the
12 levels of exposure were when they were doing some of
13 the activities that we had described here, removing
14 pipe insulation or working on boilers.

15 That data is out there, and I used it when
16 I was with the Coast Guard in determining the levels,
17 the overall dose and levels of exposure for Coast
18 Guard employees.

19 DOUG FOWLER: There is similar information
20 available from Pudget Sound Naval Shipyard and Mare
21 Island Naval Shipyard, but that information is
22 typically for shipyard tasks as opposed to shipboard
23 tasks, and we don't know very much about what typical
24 exposures were in engine rooms, boiler rooms, and
25 other machinery spaces aboard ship.

1 There have been a few pieces of
2 information as studied by Jones at Illinois Institute
3 of Technology Research Institute is about the only
4 one, and as I recall, they did one measurement -- I
5 will take it back -- three measurements in a boiler
6 room of a merchant ship underway.

7 You know, we are talking about three
8 numbers, and that is what we have to base it on
9 because that is all we have.

10 So there is a real paucity of information
11 with regard to conditions aboard ships while underway
12 and especially with regard to conditions in boiler
13 rooms while firing or receiving fire, and that kind
14 of information is just simply not known. But there
15 is a lot of information about shipyard activities.

16 FRED BOELTER: The other thing to remember
17 is when doing a dose reconstruction, often we are
18 working with the information that people say that
19 they did and drawing analogies from that, so it is
20 not a job description of strictly a machinist mate,
21 it is the descriptions of that individual saying what
22 they did while they were performing their activities.

23 I am unfortunately going to have to call
24 the end of this session and we will be around if you
25 have questions. Feel free to come up and speak with

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23 April 2007

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tjs@episervices.com
www.episervices.com**RE: Jack Nacht v. American Biltrite, Inc.**
EPI Project No. 27160
Summary Report

Dear Mr. Kurowski:

This summary report has been prepared at your request as a synopsis of my opinions regarding Mr. Jack Nacht's alleged asbestos exposure from selling floor tiles manufactured by American Biltrite, Inc. under the name Amlico. This report is based on the information provided to me in the deposition testimonies. According to these testimonies, Mr. Nacht smoked one pack of cigarettes per day from 1942 until 1960, and was diagnosed with mesothelioma in August 2006.

I have been an industrial hygienist for more than 29 years. Currently, I am President of Environmental Profiles, Inc. in Baltimore, Maryland. Formerly, I was with the National Institute for Occupational Safety and Health and led a group of industrial hygienists conducting research for the National Occupational Exposure Survey. As an industrial hygienist for the United States Coast Guard, I conducted thousands of exposure assessments of a wide range of products, including numerous asbestos-containing materials. My responsibilities also included the management of the occupational medical monitoring program for the 5th Coast Guard District. I was President of the Chesapeake Section of the American Industrial Hygiene Association (AIHA) and was a member of the national AIHA Product Health and Safety Committee and the Emergency Response Planning Committee. I have also authored the *Health and Safety Audits Manual*, published by Government Institutes, and the *AIHA Hazard Communication Guide*, published by the AIHA. The American Board of Industrial Hygiene certifies me as an industrial hygienist and the Board of Certified Safety Professionals certifies me as a safety professional.

As a certified industrial hygienist, I rely upon the following basic tools in order to conduct an exposure assessment of personal occupational exposures such as Mr. Nacht's:

1. a characterization of the workplace environment;
2. a characterization of the job and tasks (including frequency and duration of exposures);
3. a characterization of the products (including the degree of friability and encapsulation);

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4. a characterization of the relevant safety and health regulations and the associated exposure limits;
5. an appropriate association of tasks, environment, job descriptions and chemical agents with the individual exposures being evaluated; and use of the accepted air sampling and analytical techniques for occupational exposure to asbestos.

Friable and Non-Friable Asbestos Exposure

"Friable asbestos materials" is defined in Appendix C of the EPA National Emission Standards of Hazardous Air Pollutants (NESHAPS) Asbestos Regulations (40 CFR 61, Subpart M) as any materials containing more than one percent asbestos by weight that can be crumbled, pulverized, or reduced to powder by hand pressure when dry. Friable materials are more likely to release fibers when disturbed or damaged than non-friable materials. Some examples of friable asbestos products that were commonly utilized in past industrial practices include spray-fireproofing, thermal insulation, and joint compound. Exposures to friable asbestos-containing materials that have been pulverized or manipulated are typically associated with asbestos-related illnesses.

Non-friable materials, such as floor tile, are encapsulated products, with asbestos fibers bound into a matrix material, a process that significantly reduces or eliminates the potential for release of fibers. Many non-friable products are currently sold in U.S. commerce. The U.S. Environmental Protection Agency (EPA) did not ban these asbestos-containing products for sale when friable forms of asbestos products were removed from the marketplace. Additionally, various researchers have reported that encapsulated products provide opportunity for "no release, certainly no significant release, of asbestos fiber in either worker areas or general air." Some commonly used non-friable products include gaskets, packing, brake linings, caulk, roofing materials, and siding.

Occupational Exposure Regulations and Guidelines

Occupational exposure limits, including the American Conference of Governmental Industrial Hygienists (ACGIH) TLV, changed historically from more than 30 f/cc of air to today's limits of 0.1 f/cc. The OSHA Permissible Exposure Limits (PEL) also changed from 12 f/cc to 0.1 f/cc. Both the TLV and PEL are based on an eight-hour, time-weighted average.

Plaintiff's Work History

According to his deposition testimony, Mr. Nacht enlisted in the Army in 1941, where he was initially an aviation cadet, learning how to fly planes. Mr. Nacht stated that he did not perform repairs on the planes; however, he was around others who did. In 1945, Mr. Nacht was honorably discharged from the Army with a rank of Captain. After returning from the Army in 1945, Mr. Nacht testified that he worked for American Airlines for one week, and then quit because he "couldn't handle it."

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In 1945, Mr. Nacht started a company named Dee-Jay Carpet, which became Dee-Jay Incorporated in 1946. Mr. Nacht further testified that the company started as a carpet cleaning business, and later started selling carpet and tile. After beginning to sell carpet and tile, the company still cleaned carpet, but Mr. Nacht was not involved in the cleaning any longer. Mr. Nacht testified that 50 percent of the time, he personally went into the field to take measurements for carpet and tile, although he never installed either product. Mr. Nacht further testified that 60 percent of Dee-Jay's business involved carpet. Mr. Nacht owned Dee-Jay Inc. until 1997 when he stopped working.

Friable Materials

Mr. Nacht does not claim that he worked with friable, asbestos-containing materials, such as joint compound, pipe insulation or cement. These materials are causally linked with asbestos-related diseases, such as mesothelioma. Floor tile is not friable.

Plaintiff's Alleged Exposure to American Biltrite Products

According to his testimony, Amtico was one of several brands of tile Mr. Nacht ordered and sold while he owned Dee-Jay Carpet from 1946 until 1997. Mr. Nacht also testified that Amtico manufactured vinyl asbestos tile, asphalt tile and other kinds of tile. Mr. Nacht recalled first selling vinyl asbestos tile in the late 1950s or early 1960s, and reported he didn't know exactly when he first started selling Amtico. Although Mr. Nacht recalled Amtico, he could not recall specific patterns or styles related to Amtico, yet he stated further in testimony that he recalled Amtico "brick-effect" tile that he believed was asbestos because it was referred to as vinyl asbestos tile.

Mr. Nacht never installed or removed floor tile. He stated that he broke tile over his knee two or three times a day to show the color depth of the tile to customers. He did not indicate how many of these tiles he believed were asbestos-containing, nor did he testify as to how many of those alleged tiles were Amtico brand. Mr. Nacht testified he was present when his workers cleaned up areas after an installation was complete with a broom and dustpan, a process that he claimed took an hour for larger jobs. Mr. Nacht testified that 60 percent of the jobs performed by his company, Dee-Jay Inc., involved carpet, not tile. There was no testimony to how often Amtico asbestos-containing tiles were used on jobs he was present for during clean up. Mr. Nacht had no formal training on installing vinyl floor tile.

Based on a review of available literature and the following exposure assessment studies, the asbestos-containing floor tiles allegedly sold by Mr. Nacht would not have presented any airborne asbestos fiber exposures that exceeded even today's occupational health standards. Several exposure assessment studies of floor tile have documented airborne asbestos exposure during the installation of vinyl tile and support this conclusion, including one conducted by EPI.

For example, Walcott and Warrick (1979) monitored the installation of vinyl asbestos floor tile in a home. They found eight-hour time weighted average (TWA) fiber concentrations during installation that ranged from 0.008 to 0.027 fibers per cubic

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centimeter (f/cc) by phase contrast microscopy (PCM). The authors of this study concluded that these concentrations were "substantially below the allowed OSHA limit." R. Walcott and J. Warrick (1979) also monitored the removal of vinyl asbestos floor tile in a home. They found eight-hour TWA fiber concentrations during removal that ranged from 0.006 to 0.015 f/cc by PCM.

Another study concluded by the Department of the Navy (1979) evaluated workers' airborne asbestos exposure during the installation of Flintkote vinyl asbestos floor tile. The study found that "all results [were] well below Threshold Limit Values (TLV)" set by "Occupational Safety and Health Administration (OSHA)" in 1976. They concluded, "the operation of laying and cutting the vinyl-asbestos tile should constitute no potential health hazards to workers."

EPI conducted an assessment of floor tile installation and clean-up using asbestos-containing floor tiles manufactured by American Biltrite, Inc. During the six hour and 51 minute study, 161 linear feet of floor tile was cut using the following techniques:

- Guillotine cutter
- Utility knife
- Scribe score and snap break
- Shears (heat and cut; no heat and cut)
- Linoleum knife

Results of the EPI study showed that no asbestos fibers were detected for the worker and his helper during the tile cutting, installation and subsequent clean up. Based on the air sample analyses by NIOSH 7402, the measured airborne asbestos concentration are below the detection limits for the worker and helper of <0.00044 and <0.00045 f/cc, respectively. Area samples were also collected during the cutting, installation and clean up of Amtico asbestos-containing tile. All samples were below the limit of detection when analyzed by NIOSH 7402 (TEM).

These studies were based on workers actually installing, removing and cleaning up floor tile, which Mr. Nacht never did. The conclusions showed that workers would not have been exposed to asbestos-containing fibers in excess of today's standards during the installation, removal or clean-up of vinyl asbestos tile. Mr. Nacht's exposure to asbestos from Amtico tile, if any, would be irrelevant.

Ambient Asbestos Concentrations

Various researchers have also evaluated the ambient airborne levels of asbestos in our living environments, separate from the workplace. It is evident from the reported results that the airborne asbestos fiber concentrations were dependant upon geographic location. Asbestos fiber concentrations were higher in urban environments, as well as in locations that had geologic asbestos mineral formations. In urban settings, researchers have found ambient fiber concentrations of 0.2 f/cc and greater.

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Researchers have conducted autopsies of individuals without asbestos-related diseases not occupationally exposed to asbestos, yet exposed to asbestos through their ambient environment. In a study conducted by Langer and Nolan, lung specimens were collected from 3,000 people between 1966 and 1968. The range of asbestos fibers detected in the lung tissue was reported at less than 580,000 to 15,740,000 asbestos fibers per gram of dry lung tissue. Moreover, in 1971, Drs. Laner, Schikoff and Sastre reported that chrysotile asbestos was present in 24 of 28 consecutive non-occupationally exposed New York City autopsy cases. This clearly demonstrates that asbestos was present in the general environment, resulting in exposures for individuals not occupationally exposed to asbestos.

EPA asbestos regulations for schools, known as the Asbestos Hazard Emergency Response Act (AHERA), allows for up to as many as 70 asbestos structures per square millimeter (s/mm²) or 6,503,213 asbestos structures per square foot collected on air sample filters following an abatement action. This reflects an allowance for the presence of some asbestos in the school environment following an asbestos abatement activity.

Conclusions

According to his own testimony, Mr. Nacht never installed or removed floor tile, including tile identified as Amtico; he only handled the tile when showing customers samples that came out of a box. During the process of showing a sample tile to a customer, Mr. Nacht testified he broke two to three tiles a day over his knee to demonstrate the color depth of the tile. He did not indicate how often he showed customers an Amtico tile compared to other brands of tile. Mr. Nacht also testified that he was present at the end of floor tile installation while others were sweeping up debris. Mr. Nacht stated that it took up to one hour to clean larger jobsites, and stated that only 40 percent of the jobs involved floor tile. He did not state how many of those jobs involved Amtico tile, nor did he indicate how often he observed his workers cleaning up after tile installation.

Studies conducted on personnel actually installing and removing floor tile and cleaning up debris after floor tile installation produced concentrations well below today's stringent standards regarding asbestos. Therefore, Mr. Nacht's alleged encounters with American Biltrite-manufactured Amtico tiles would likely have presented him with little or no exposure to asbestos.

I base this conclusion on my more than 29 years experience as an industrial hygienist and safety professional. My experience has included health hazard evaluations and audits of multiple operations within industrial, academic, commercial, and residential facilities. My experience has also included the development of exposure assessment strategies, and training of employees who worked in numerous industrial operations. I also base my opinion upon portions of scientific literature and exposure assessments of encapsulated materials. Furthermore, I have completed studies on American Biltrite floor tile and floor tiles similar to those manufactured by American Biltrite, Inc. completed by others.

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For the purposes of this report, I have reviewed numerous documents, articles, studies and publications, which include but are not limited to the following:

1. Deposition of Jack Nacht, taken 21 November 2006
2. Deposition of Jack Nacht, taken 4 December 2006
3. Deposition of Jack Nacht, taken 7 February 2007
4. Plaintiff's Answers to Interrogatories
5. Various occupational safety and health publication and articles developed by governmental agencies, professional and trade associations, voluntary consensus standards organizations, and researchers.
6. Code of Federal Regulations, 29 CFR Part 1910 and Part 1926.
7. American Conference of Governmental Industrial Hygienists, Documentation of Threshold Limit Values, 1946 to present.
8. Environmental Profiles, Inc. Report of Findings: Evaluation of Airborne Asbestos Exposure to Workers During Handling, Installation and Clean-up of Amtico Floor Tile Manufactured by American Biltrite Inc., 12 January 2007.
9. Boelter, F. and Spencer J. Installation 1970 Vintage Congoleum Vinyl Asbestos Tile Isolation Test Chamber. 20 June 2002.
10. Boelter, F. and Spencer J. Complete Removal 1970 Vintage Congoleum Vinyl Asbestos Tile Residential Bathroom. 27 June 2002.
11. Boelter F. and Spencer J. Partial Installation 1970 Vintage Congoleum Vinyl Asbestos Tile Residential Bathroom. 25 June 2002.
12. Boelter F. and Spencer J. Partial Installation 1970 Vintage Congoleum Vinyl Asbestos Tile Residential Bathroom. 24 June 2002.
13. Boelter & Yates Environmental Engineers and Scientists. Asbestos Content of Floor Tiles Congoleum Litigation Related. 17 July 1998.
14. Walcott, R. and Warrick, J. 1979. *Monitoring for Airborne Asbestos Fibers: Vinyl Asbestos Floor Tile*. December 1979.
15. Osborne, JE. 1979. Industrial Hygiene Survey of Airborne Asbestos Concentrations from Vinyl-Asbestos tile Operations. *Department of the Navy* 23 May 1979.
16. Wendlick, Joseph D. CIH. Ambient Asbestos Fiber Levels at Selected Sites in Philadelphia, Pennsylvania. November 1984.
17. Langer, Arthur M. and R.P. Nolan. 1994. "Chrysotile Biopersistence in the Lungs of Persons in the General Population and Exposed Workers." *Environmental Health Perspective*. 102 (Supplement 5): 235-239.
18. Langer, Arthur M. and R.P. Nolan. 1994. "Chrysotile Asbestos in the lung of persons in New York," *Arc. Environ. Health*. 22:348-361

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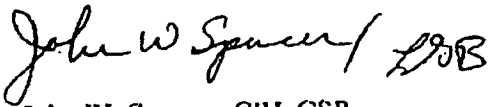
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19. Andrion, A., D. Bellis, E. Bertoldo and F. Mollo. 1984. "Coated and Uncoated Lung Mineral Fibers in Subjects With and Without Pleural Plaques at Autopsy," *Path. Res. Pract.* 178:611-616.
20. Selikoff, Irving J. 1970. "Partnership for Prevention - The Installation Industry Hygiene Research Program," *Industrial Medicine*. 39:162-166.
21. Federal Register, U.S. Environmental Protection Agency, 40 CFR, Parts 763, Asbestos: Manufacturing, Importation, Processing and Distribution in Commerce Prohibitions; Final Rule; July 12, 1989.
22. Federal Register, U.S. Environmental Protection Agency, 40 CFR, Parts 61, NESHAP Revision; Final Rule; November 20, 1990.
23. Federal Register, Occupational Safety and Health Administration 29 CFR 1910, 1915, and 1926, Occupational Exposure to Asbestos; Corrections.
24. U.S. Environmental Protection Agency (EPA). 1982. Analysis of Fiber Release from Certain Asbestos Products, draft Final Report. December 1982.
25. Corrosion Proof Fittings v. The EPA 947 F. 2d 1201 (5th Cir. 1991).

This report is based on the information available to me at this time. Should additional information become available, I reserve the right to determine the impact, if any, of the new information on my opinions and conclusions, and to revise my opinions and conclusions if necessary.

Sincerely,



John W. Spencer, CIH, CSP
President

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24 April 2007

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Mr. John Kurowski, Esquire
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24 Bronze Pointe
Swansea, IL 62226jkurowski@epi-services.com
www.epi-services.com**RE: Harvey Helfand v. American Biltrite, Inc.**
EPI Project No. 27161
Summary Report

Dear Mr. Kurowski:

This summary report has been prepared at your request as a synopsis of my opinions regarding Mr. Harvey Helfand's alleged asbestos exposure from floor tiles manufactured by American Biltrite, Inc. under the name 'Amtico.' Mr. Helfand's exposure allegedly occurred during home renovation projects that he completed from 1950 until 1998 at his various residences. According to the deposition testimonies, Mr. Helfand, born 8 November 1935, was diagnosed with mesothelioma on 11 October 2006. He allegedly smoked one pack of cigarettes per day from the 1950s through the 1970s.

I have been an industrial hygienist for more than 29 years. Currently, I am President of Environmental Profiles, Inc. in Baltimore, Maryland. Formerly, I was with the National Institute for Occupational Safety and Health and led a group of industrial hygienists conducting research for the National Occupational Exposure Survey. As an industrial hygienist for the United States Coast Guard, I conducted thousands of exposure assessments of a wide range of products, including numerous asbestos-containing materials. My responsibilities also included the management of the occupational medical monitoring program for the 5th Coast Guard District. I was President of the Chesapeake Section of the American Industrial Hygiene Association (AIHA) and was a member of the national AIHA Product Health and Safety Committee and the Emergency Response Planning Committee. I have also authored the *Health and Safety Audits Manual*, published by Government Institutes, and the *AIHA Hazard Communication Guide*, published by the AIHA. The American Board of Industrial Hygiene certifies me as an industrial hygienist and the Board of Certified Safety Professionals certifies me as a safety professional.

As a certified industrial hygienist, I rely upon the following basic tools in order to conduct an exposure assessment of personal occupational exposures such as Mr. Helfand's:

1. a characterization of the workplace environment;
2. a characterization of the job and tasks (including frequency and duration of exposures);

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3. a characterization of the products (including degree of friability and encapsulation);
4. a characterization of the relevant safety and health regulations and the associated exposure limits;
5. an appropriate association of tasks, environment, job descriptions and chemical agents with the individual exposures being evaluated; and
6. use of the accepted air sampling and analytical techniques for occupational exposure to asbestos.

Friable Asbestos Exposure

"Friable asbestos materials" is defined in Appendix C of the EPA National Emission Standards of Hazardous Air Pollutants (NESHAPS) Asbestos Regulations (40 CFR 61, Subpart M) as any materials containing more than one percent asbestos by weight that can be crumbled, pulverized, or reduced to powder by hand pressure when dry. Friable materials are more likely to release fibers when disturbed or damaged than non-friable materials. Some examples of friable asbestos products that were commonly utilized in past industrial practices include spray fireproofing, thermal insulation, and joint compound.

Non-friable materials are encapsulated products, with asbestos fibers bound into a matrix material, a process that significantly reduces or eliminates the potential for release of fibers. Many non-friable products are currently sold in U.S. commerce. The U.S. Environmental Protection Agency (EPA) did not ban these asbestos-containing products for sale when friable forms of asbestos products were removed from the marketplace. Additionally, various researchers have reported that encapsulated products provide opportunity for "no release, certainly no significant release, of asbestos fiber in either worker areas or general air." Some commonly used non-friable products include gaskets, packing, brake linings, caulk, roofing materials, floor tile, and siding.

Occupational Exposure Regulations and Guidelines

Occupational exposure limits, including the American Conference of Governmental Industrial Hygienists (ACGIH) TLV, changed historically from more than 30 f/cc of air to today's limits of 0.1 f/cc. The OSHA Permissible Exposure Limits (PEL) also changed from 125 f/cc to 0.1 f/cc. Both the TLV and PEL are based on an eight-hour, time-weighted average.

Plaintiff's Work History

According to the materials I have reviewed, Mr. Helfand worked part-time during high school at Rabin Typographers. He referred to himself as a "flunky," who performed cleaning duties, picked up lead, and typed on occasion. Mr. Helfand indicated that he worked at this job for five hours per day during the school week, and full-time during holidays and summer break. Mr. Helfand believed he was exposed to asbestos from cleaning lead pots that he alleged were lined with asbestos.

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Mr. Helfand then attended the New York School of Printing, a vocational school where he received training in mechanical repair. After Mr. Helfand received this training, he began a career in the printing business, which is summarized in the table below:

Approximate Dates	Employer	Title/Position	Alleged Exposure
1952-1956	United Offset	'Flunky,' Helper (serviced and cleaned the machines)	None
1956-1963	Ramapo Litho Company	Pressman	None
? 3 4 years	Muree Press	Foreman	None
? 2 years	Service Offset	Foreman	None
? 6 mos	Ross Printing	Pressman	None
6 mos	Triple M	Pressman, Foreman	None
1970-1992	H&H Multicolor Self-employed	Manager	None
Early 1990s-2006	Spectrum Printing	Production person	None

Mr. Helfand also completed a number of home-renovation projects at his various residences from 1958 until 1998. Prior to performing these renovations, he allegedly helped his father work on a boiler as a child and construct a basement apartment when he was 15 years old. His home renovations reportedly included reinsulating the back of his house, performing minor repairs to a rental property from 1960 to 1963, renovating a basement in 1965, remodeling from 1965 until 1967, and installing a kitchen in the early 1980s. While completing these various remodels, Mr. Helfand performed work involving drywall, electric, ceiling tiles, flooring, insulation, boilers, pipes, plumbing, and paint. Furthermore, he estimated that 70% of his work occurred at the printing facilities, and 30% of the work was home improvement.

Plaintiff's Exposure to Friable Asbestos Products

Mr. Helfand claimed exposure to friable asbestos materials from his home renovation projects and his part-time employment at Rabin Typographers. He claimed exposures to asbestos cement, pipe insulation, joint compound, and ceiling tiles.

At Rabin, where Mr. Helfand worked part-time in high school, Mr. Helfand was allegedly present while asbestos cement was 'chipped out' of and reapplied to the lead pots. He stated that the outsides of the pots were covered with asbestos cement for insulation purposes and the cement sometimes had to be removed and reapplied. He claimed that the removal process created a lot of dust, which he was responsible for cleaning up. Mr. Helfand also reported that the new cement to be applied might have been mixed from a powdered form. If this material was asbestos-containing, Mr. Helfand's presence during the removal and application of the asbestos cement could have exposed him to respirable asbestos fibers.

During the course of his residential renovations, Mr. Helfand reportedly installed and removed pipe covering and 'boiler wrap.' He described the 'boiler wrap' and pipe covering as white or beige and similar to "a cast on your foot." He indicated that he ripped this material out when removing boilers. Mr. Helfand further indicated that his

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first exposure to asbestos occurred when he insulated a four-inch pipe associated with the boiler in his childhood home. He wrapped the pipe using insulation that was formed in two halves, which strapped together. Mr. Helfand stated that he completed a 'blow out' of the boiler as well. A study by Balzer et. al. titled, "Dust Producing Potential of Construction Materials," reported that mean personal exposures during insulation removal ranged from 13.4 f/cc to 268.4 f/cc, and mean personal exposures during insulation installation ranged from 6.5 to 113.9 f/cc, when analyzed by phase contrast microscopy. If the insulation associated with the boilers and piping did contain asbestos, Mr. Helfand's execution of the abovementioned tasks could have exposed him to airborne concentrations of asbestos in excess of today's occupational standards.

Mr. Helfand reported considerable exposure to asbestos-containing joint compound associated with drywall installation and removal. He believed that he was exposed to asbestos from the removal of these materials during the reinsulation of the back of his house and the renovation of his kitchen in the early 1980s. Mr. Helfand believed he was exposed to asbestos from the installation of these materials during the renovation of his mother's basement in 1958, and his basement in 1965. During this project, which lasted six months, Mr. Helfand installed sheetrock, taped it, and then applied from three to six coats of joint compound. He further reported that he performed many small patching jobs using joint compound throughout the years.

Mr. Helfand identified four manufacturers of joint compound who are historically known to have manufactured joint compound that contained asbestos. He described the various products as powdered form, which he initially used, and ready-mix that he eventually switched to using all of the time. Mr. Helfand indicated that he mixed the powdered joint compound with water using a small spatula or shovel to prepare it for application. He applied five to six coats of the joint compound on each drywall seam, using various-sized knives, in order to make the seam completely smooth. After application, Mr. Helfand reported, he let the product dry and then sanded it for ten to 15 minutes per seam, a process that he described as very dusty. Mr. Helfand claimed that he performed the drywall operations in rooms with no ventilation, and he wore no mask or respirator.

A study by Fischbein, et al, titled "Drywall Construction and Asbestos Exposure," evaluated drywall workers' exposures to airborne asbestos during an array of drywall tasks. The study reported personal exposures during dry mixing ranging from 35.4 to 59.0 f/cc with a mean of 47.2 f/cc. The study reported personal exposures during hand sanding ranging from 1.3 to 16.9 f/cc with a mean of 5.3 f/cc. 15 minutes after sweeping the floor, the area concentration within ten to fifty feet was 41.4 f/cc. From this data, it is shown that Mr. Helfand's completion of drywall work over the years could have exposed him to high levels of respirable asbestos.

Finally, Mr. Helfand claimed exposure to asbestos from the cutting, installation and removal of ceiling tiles during his home renovations. He stated:

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"I was always exposed to...old ceiling. You know, the Celotex ceilings. Armstrong. Not only did I put up myself, but the stuff that was there that we ripped down, so I know that...In fact, when you rip it down, you know, it gets dusty, dirty...I guess that what just did me in."

He described the ceiling tiles that he removed and installed as "acoustical." A study by William McKinnery, titled "Evaluation of Airborne Asbestos Fiber Levels During Cutting Of Vinyl Asbestos Flooring Tile and Asbestos-Containing Ceiling Tile Operations," reported personal exposure levels when cutting asbestos-containing ceiling tile ranging from 0.14 to 0.37 f/cc, with a mean of 0.25 f/cc, when analyzed by phase contrast microscopy.

Plaintiff's Alleged Exposure to American Bilrite Products

Mr. Helfand reportedly installed Amtico floor tile when he renovated the kitchen of his home in the early 1980s. He described the floor tile as 12 inch by 12 inch. Mr. Helfand indicated that he cut the tile by scoring it and snapping it, sometimes using heat to facilitate the process. He first applied a 'film' to the back of the tile and then laid it down, beginning in the center of a room and continuing to the edges. Mr. Helfand could not identify any model, style, or color of the alleged Amtico tile he used. His testimony was unclear as to whether and when he may have used Amtico tile on other occasions.

Mr. Helfand further claimed that he might have removed floor tile manufactured by American Bilrite, although he could not identify the manufacturer of the tile that he removed. He described the removal process using an ice scraper. If the floor did not get clean, he reported, he would resurface the floor before laying new tile. Mr. Helfand further testified that tiles sometimes broke, but more often they "pop[ped] up" as full tiles when he tried to remove them.

Based on a review of available literature and the following exposure assessment studies, if Amtico tiles allegedly used by Mr. Helfand did contain asbestos, his work with them would not have presented any airborne asbestos fiber exposures that exceeded even today's strict occupational health standards. Several exposure assessment studies of floor tile have documented airborne asbestos exposure during the installation of vinyl asbestos tile and support this conclusion, including one conducted by EPI.

For example, Walcott and Warrick (1979) monitored the installation of vinyl asbestos floor tile in a home. They found eight-hour time weighted average (TWA) fiber concentrations during installation that ranged from 0.008 to 0.027 fibers per cubic centimeter (f/cc) by phase contrast microscopy (PCM). The authors of this study concluded that these concentrations were "substantially below the allowed OSHA limit." R. Walcott and J. Warrick (1979) also monitored the removal of vinyl asbestos floor tile in a home. They found eight-hour TWA fiber concentrations during removal that ranged from 0.006 to 0.015 f/cc by PCM.

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The previously referenced McKinney study reported personal exposure levels when cutting vinyl asbestos floor tile ranging from below the limit of detection (0.02 f/cc) to 0.04 f/cc, well below the occupational health standards.

Another study, conducted by the Department of the Navy (1979), evaluated workers' airborne asbestos exposure during the installation of Flintkote vinyl asbestos floor tile. The study found that "all results [were] well below Threshold Limit Values (TLVs)" set by Occupational Safety and Health Administration (OSHA) in 1976. They concluded, "the operation of laying and cutting the vinyl-asbestos tile should constitute no potential health hazards to workers."

EPI conducted an assessment of floor tile installation and clean-up using asbestos-containing floor tiles manufactured by American Biltrite, Inc. During the six hour and 51 minute study, 161 linear feet of floor tile was cut using the following techniques:

- Guillotine cutter
- Utility knife
- Scribe score and snap break
- Shears (heat and cut; no heat and cut)
- Linoleum knife.

Results of the EPI study showed that no asbestos fibers were detected for the worker and his helper during the tile cutting, installation and subsequent clean-up. Based on the air sample analyses by NIOSH 7402, the measured airborne asbestos concentration were below the detection limits for the worker and helper of <0.00044 and <0.00045 f/cc, respectively.

These studies were based on workers actually installing and removing floor tile. The conclusions show that workers would not have been exposed to asbestos-containing fibers in excess of today's standards during the installation or removal of vinyl asbestos tile.

Ambient Asbestos Concentrations

Various researchers have also evaluated the ambient airborne levels of asbestos in our living environments, separate from the workplace. It is evident from the reported results that the airborne asbestos fiber concentrations were dependant upon geographic location. Asbestos fiber concentrations were higher in urban environments, as well as in locations that had geologic asbestos mineral formations. In urban settings, researchers have found ambient fiber concentrations of 0.2 f/cc and greater.

Researchers have conducted autopsies of individuals without asbestos-related diseases not occupationally exposed to asbestos, yet exposed to asbestos through their ambient environment. In a study conducted by Langer and Nolan, lung specimens were collected from 3,000 people between 1966 and 1968. The range of asbestos fibers detected in the

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lung tissue was reported at less than 580,000 to 15,740,000 asbestos fibers per gram of dry lung tissue. Moreover, in 1971, Drs. Langer, Selikoff and Sastre reported that chrysotile asbestos was present in 24 of 28 consecutive non-occupationally exposed New York City autopsy cases. This clearly demonstrates that asbestos was present in the general environment, resulting in exposures for individuals not occupationally exposed to asbestos.

EPA asbestos regulations for schools, known as the Asbestos Hazard Emergency Response Act (AHERA), allows for up to as many as 70 asbestos structures per square millimeter (s/mm^2) or 6,503,213 asbestos structures per square foot collected on air sample filters following an abatement action. This reflects an allowance for the presence of some asbestos in the school environment following an asbestos abatement activity.

Conclusions

According to the plaintiff's deposition, Mr. Helfand removed and installed friable asbestos-containing insulation associated with boilers during the course of his home repairs. He claimed exposure from the removal and installation of asbestos cement on lead crucibles at Rabin Typographers that occurred in his presence. Mr. Helfand also allegedly mixed, applied, and sanded asbestos-containing joint compound in association with several projects involving drywall work. His presence during these activities and his personal mixing and application of the asbestos cement and joint compound could have exposed him to levels of respirable asbestos in excess of today's occupational exposure limits. Friable materials are typically associated with asbestos-related diseases, such as mesothelioma.

Mr. Helfand testified that he cut and installed floor tile manufactured by American Biltrite under the name 'Amtico,' while performing home remodeling of his kitchen in the early 1980s. He may have installed and removed Amtico on other occasions as well. Mr. Helfand offered no description of the product other than its size, and there was no indication that the alleged Amtico floor tile contained asbestos. Even if the alleged Amtico tile did contain asbestos, Mr. Helfand's infrequent encounters with American Biltrite-manufactured Amtico tiles would have presented him with little or no exposure to asbestos.

I base this conclusion on my more than 29 years experience as an industrial hygienist and safety professional. My experience has included health hazard evaluations and audits of multiple operations within industrial, academic, commercial, and residential facilities. My experience has also included the development of exposure assessment strategies, and training of employees who worked in numerous industrial operations. I also base my opinion upon portions of scientific literature and exposure assessments of encapsulated materials I have completed on American Biltrite floor tile and floor tiles similar to those manufactured by American Biltrite, Inc. completed by others.

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For the purposes of this report, I have reviewed numerous documents, articles, studies and publications, which include but are not limited to the following:

1. Deposition of Harvey Helfand, taken 5 through 9 October 2006
2. Plaintiff's Fact Sheet
3. Various occupational safety and health publication and articles developed by governmental agencies, professional and trade associations, voluntary consensus standards organizations, and researchers.
4. Code of Federal Regulations, 29 CFR Part 1910 and Part 1926.
5. American Conference of Governmental Industrial Hygienists. Documentation of Threshold Limit Values. 1946 to present.
6. Environmental Profiles, Inc. Report of Findings: Evaluation of Airborne Asbestos Exposure to Workers During Handling, Installation and Clean-up of Amtico Floor Tile Manufactured by American Biltrite Inc., 12 January 2007.
7. Boelter, F. and Spencer J. Installation 1970 Vintage Congoleum Vinyl Asbestos Tile Isolation Test Chamber. 20 June 2002.
8. Boelter, F. and Spencer J. Complete Removal 1970 Vintage Congoleum Vinyl Asbestos Tile Residential Bathroom. 27 June 2002.
9. Boelter F. and Spencer J. Partial Installation 1970 Vintage Congoleum Vinyl Asbestos Tile Residential Bathroom. 25 June 2002.
10. Boelter F. and Spencer J. Partial Installation 1970 Vintage Congoleum Vinyl Asbestos Tile Residential Bathroom. 24 June 2002.
11. Boelter & Yates Environmental Engineers and Scientists. Asbestos Content of Floor Tiles Congoleum Litigation Related. 17 July 1998.
12. Walcott, R. and Warrick, J. 1979. *Monitoring for Airborne Asbestos Fibers: Vinyl Asbestos Floor Tile*. December 1979.
13. Osborne, J.E. 1979. Industrial Hygiene Survey of Airborne Asbestos Concentrations from Vinyl-Asbestos tile Operations. *Department of the Navy* 23 May 1979.
14. Wendlick, Joseph D. CIH. Ambient Asbestos Fiber Levels at Selected Sites in Philadelphia, Pennsylvania. November 1984.
15. Langer, Arthur M. and R.P. Nolan. 1994. "Chrysotile Biopersistence in the Lungs of Persons in the General Population and Exposed Workers." *Environmental Health Perspective*. 102 (Supplement 5): 235-239.
16. Langer, Arthur M. and R.P. Nolan. 1994. "Chrysotile Asbestos in the lung of persons in New York," *Arc. Environ. Health*. 22:348-361

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17. Andrion, A., D. Bellis, E. Bertoldo and F. Mollo. 1984. "Coated and Uncoated Lung Mineral Fibers in Subjects With and Without Pleural Plaques at Autopsy," *Path. Res. Pract.* 178:611-616.
18. Selikoff, Irving J. 1970. "Partnership for Prevention - The Installation Industry Hygiene Research Program," *Industrial Medicine*. 39:162-166.
19. Federal Register, U.S. Environmental Protection Agency, 40 CFR, Parts 763. Asbestos: Manufacturing, Importation, Processing and Distribution in Commerce Prohibitions: Final Rule; July 12, 1989.
20. Federal Register, U.S. Environmental Protection Agency, 40 CFR, Parts 61, NESHAP Revision: Final Rule: November 20, 1990.
21. Federal Register, Occupational Safety and Health Administration 29 CFR 1910. 1915, and 1926. Occupational Exposure to Asbestos; Corrections.
22. U.S. Environmental Protection Agency (EPA). 1982. Analysis of Fiber Release from Certain Asbestos Products. draft Final Report. December 1982.
23. Corrosion Proof Fittings v. The EPA 947 F. 2d 1201 (5th Cir. 1991).
24. Fleischer, Walter E., et.al. "A Health Survey of Pipe Covering Operations in Constructing Naval Vessels." *Journal of Industrial Hygiene and Toxicology*. Vol. 28, No. 1. Copyright 1946
25. Fischbein, et al. "Drywall Construction and Asbestos Exposure," *American Industrial Hygiene Association Journal*. Vol. 40, May 1979.
26. National Gypsum Company, "Release of Air Contaminants in Mixing and Sanding Joint Treatment Products," 3 July 1973.
27. Gypsum Association, "Evaluation of Exposure to Asbestos During Mixing and Sanding of Joint Compounds," 19 November 1973.
28. Balzer, J.L. and Cooper, W.C., "The Work Environment of Insulating Workers," *American Industrial Hygiene Association Journal*. May-June 1968.
29. Balzer, J.L.; Fowler, D.F.; and Cooper, W.C. "Dust-Producing Potential of Construction Materials." *Safety and Health in Shipbuilding and Ship Repairing*, ILO, Geneva, 1972.
30. McKinnery, William. "Evaluation of Airborne Asbestos Fiber Levels During Cutting of Vinyl Asbestos Floor Tile and Asbestos-Containing Ceiling Tile Operations."

This report is based on the information available to me at this time. Should additional information become available, I reserve the right to determine the impact, if any, of the

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new information on my opinions and conclusions, and to revise my opinions and conclusions if necessary.

Sincerely,

A handwritten signature in dark ink, appearing to read "John W. Spencer" followed by a stylized flourish or set of initials.

John W. Spencer, CIH, CSP
President

JWS/kch

James C. Rock, PhD, PE, CIH
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12 July 2007

Gregg J Borri, Esq
Gregg J Borri Law Offices
61 Broadway, Suite 2125
New York, NY 10006

Re: Harvey Helfand, Index No.117176/06; in Re: New York City Asbestos Litigation,
Supreme Court of the State of New York, All Counties within New York State.

Dear Mr Borri:

This letter serves as my report on the referenced matter. The purpose of my review was to assess Mr Harvey Helfand's asbestos exposure-dose in relation to his alleged asbestos-related mesothelioma. My focus has been on exposures potentially attributable to dust from Georgia-Pacific (GP) joint compound products, and whether they put him at risk for mesothelioma.

You provided the following documents:

1. Plaintiff's Responses to Defendant's 4th Amended Interrogatories and RFP, 17 Nov 2006
2. Deposition of Harvey Helfand, Volume I, 22 Jan 2007 w outline
3. Deposition of Harvey Helfand, Volume II, 29 Jan 2007 w outline
4. Deposition of Harvey Helfand, Volume III, 9 Mar 2007 w outline
5. Video Deposition of Harvey Helfand, 11 May 2007 w outline
6. SS records for Harvey Helfand, received 10 July 2007 via email

Harvey Helfand was born on 8 November 1935. He lived most of his life in Brooklyn, NY; he moved in 1998 to his present home in New Jersey. He married Leona in 1958 and he has 3 grown daughters. Mr Helfand was a member of the Printers Union Local 51 and the Amalgamated Lithographers Union Local 1, from the mid 1950s to the mid 1970s. He started smoking at age 15 (1950) and quit in the mid 1970s. He smoked Chesterfield, Parliament, and Kent cigarettes.¹ He was diagnosed with mesothelioma in October 2006.

Asbestos Health Effects

The industrial hygiene hierarchy of controls for chemical hazards favors substitution of less hazardous chemicals whenever possible, and requires an industrial hygienist to be familiar with relevant chemical and toxic mechanisms for asbestos and its proposed substitute. From *chemistry* the amphiboles are solid crystalline needles that are rich in iron, aluminum, calcium and sodium silicates while pure chrysotile is formed as a hollow scroll rolled from magnesium

¹Deposition of Harvey Helfand, Vol 1, 1/22/07, pp 8-9; Vol 2, 1/29/07, pp161-2.

silicate sheets.² From *biochemistry*, chrysotile apparently has a tolerable positive surface charge in physiological solutions, whereas the amphiboles are negatively charged and apparently mutagenic both by direct contact and indirectly by producing reactive oxygen (ROS) and reactive nitrogen species (RNS) in body fluids.^{3,4,5} This recent evidence confirms early metal toxicity postulated by W E Cooke when he described and named asbestosis; he noted black inclusions at weak spots in raw asbestos fibers; he saw that finished fibers were free from these spots which were concentrated in textile factory dust and in asbestotic lungs; he identified the spots as iron oxide; and he linked iron to asbestosis that was more prevalent among raw fiber workers than among those exposed only to dust from finished fibers.⁶ From early animal *toxicology*⁷ and subsequent human *epidemiology*, the shape of fibers is important: solid amphibole fibers are more potent than hollow chrysotile fibers, and fibers smaller than 0.25 μm diameter and longer than 20 μm have the most potency.⁸ From *microscopic pathology*, long silky chrysotile fibers do not penetrate the deep lungs as easily as long straight amphibole fibers. Those chrysotile fibers that get there are cleared in days to weeks while amphiboles and some long chrysotile (>20 μm) remain for decades.⁹ An industrial hygienist seeks an asbestos substitute that does not contain iron, aluminum, or calcium silicates, does not have thin fibrils between 20 and 100 μm long, and produces neither toxic surface charge polarity nor reactive chemicals in body fluids. Pure short-fiber chrysotile has these properties.

State-of-the-art for Drywall Manufacturers

There is reasonable scientific certainty that career drywall tapers are not at risk of mesothelioma.¹⁰ Joint compound dust fails to elevate mesothelioma risk for full-time drywall finishers because the chrysotile fibers in joint compound were too short (most were < 5 μm),¹¹

²Rosato, D.V. "Asbestos Its Industrial Application." Rheinolt Publishing Co. NY (1959), Table 2.1, from: *Encyclopedia of Chemical Technology*, Vol 2, New York & London, Interscience Publisher, (1948).

³Wu, J. W. Liu, K. Koenig, S. Idell and V. C. Broadus: "Vitronectin Adsorption to Chrysotile Asbestos Increases Fiber Phagocytosis and Toxicity for Mesothelial Cells." *Am J Physiol - Lung Cell Mol Physiol* 279:916-923 (2000).

⁴Maples, K.R., and N.F. Johnson: "Fiber-induced Hydroxyl Radical Formation: Correlation with Mesothelioma Induction in Rats and Humans." *Carcinogenesis* 13(11): 2035-2039 (1992).

Upadhyay, D., and D.W. Kamp: "MINIREVIEW Asbestos-Induced Pulmonary Toxicity: Role of DNA Damage and Apoptosis" *Exp Biol Med* 228:650-659 (2003).

⁵Kamp, D.W., V. Panduri, S.A. Weitzman and N. Chandel: "Asbestos-induced Alveolar Epithelial Cell Apoptosis: Role of Mitochondrial Dysfunction Caused by Iron-derived Free Radicals." *Mol and Cell Biochemistry* 234/235: 153-160 (2002).

⁶Cooke, W.E.: "Pulmonary Asbestosis." *Br J Medicine* p 1024-1025 (1927).

⁷Gardner, L.U.: *Industrial Medicine*, (1940) Vol 9 p 45 mentioned in 1958 edition of Patty's *Ind Hyg & Tox* 2nd ed. Stanton, M.F. and C. Wrench: "Mechanisms of Mesothelioma Induction with Asbestos and Fibrous Glass." *J National Cancer Institute* 48(3):797-821 (Mar 1972).

⁸Hodgson, J.T. and A. Darnton: "The Quantitative Risks of Mesothelioma and Lung Cancer in Relation to Asbestos Exposure." *Ann Occup Hyg* 44(8):565-601 (2000).

⁹Roggli, V.L., T.D. Oury & T.A. Sporn: *Pathology of Asbestos-Associated Diseases*, 2nd Ed. 2004; Springer-Verlag, NY Bernstein, DM, JA Hoskins: "The Health Effects of Chrysotile: Current Perspective based upon Recent Data." *Regul Tox Pharmacology* 45:252-264 (2006).

Yarborough CM. "Chrysotile as a Cause of Mesothelioma: An Assessment Based on Epidemiology" *Critical Reviews in Toxicology* 36:165-187 (2006).

¹⁰Roggli, V.L., A. Sharma, K.J. Butnor, T. Sporn and R.T. Vollmer: "Malignant Mesothelioma and Occupational Exposure to Asbestos: A Clinicopathologic Correlation of 1445 Cases." *Ultrastructural Pathology* 26: 55-65 (2002). Top left, pg 56.

¹¹RoC: Asbestos CAS # 1332-21-4, 8th Report on Carcinogens, shows that NIEHS and OSHA knew that Grade 7 (length < 3 μm) chrysotile was used in coatings and adhesives <http://ntp-server.niehs.nih.gov/htdocs/8_RoC/KC/Asbestos.html>.

Rohl, A.N., A.M. Langer, I.J. Selikoff & W.J. Nicholson: "Exposure to Asbestos in the Use of Consumer Spackling, Patching, and Taping Compounds." *Science* 189:551-553 (15 Aug 75). The longest fiber in air samples was shorter than 3 μm .

had a non-potent chemical composition and a distinct silky morphology. It follows that part-time joint compound users and bystanders, with lower intensities and shorter durations, have lower mesothelioma risk, if any, than the unmeasurable risk of full-time drywall tapers.

After WW II, joint compound and drywall technology replaced wet plaster in the building industry. This eliminated raw asbestos and reduced the quantity of asbestos-containing "muds" used on construction sites by a factor of 15 to 200, dramatically reducing occupational exposures. Between 1950 and 1980 there were occasional reports of dust concentrations during specific short tasks such as mixing, sanding or sweeping dust from joint compound. Verma and Middleton reviewed prior literature and quantified asbestos exposure intensity for full time drywall workers, in terms of 8-hour time-weighted average (TWA) measurements, taken at residential and commercial job sites.¹² They reported that tapers' exposure intensity was 4.5 [f/mL] when dry mix joint compound was used and 2.1 [f/mL] when premix was used. These intensities are within the OSHA permissible exposure limit (PEL) that applied until June 1976. A 40-year drywall finisher retiring at the end of 1978 had a lifetime exposure-dose less than 20% of that allowed by contemporary occupational exposure limits throughout his career.

Dose Response for Mesothelioma

Dose Response quantifies a key principle of healthy living, moderation in all things. A foundational axiom for that principle – that all substances are toxic in sufficient doses and tolerated or beneficial in small doses – is traced to Paracelsus' 1567 manuscript in the popular book, *The Dose Makes the Poison*.¹³ As translated, Paracelsus wrote:

What is it that is not a poison? All things are poison and nothing is without poison. It is the dose only that makes a thing not a poison.

Ottoboni notes that dose response data show decreasing latencies¹⁴ and increasing incidence rates in exposed populations with increasing doses. She defines a practical threshold dose for carcinogens as one associated with a latency longer than the average life span of the exposed population or with an incidence rate lower than the size of the exposed population. Asbestos associated mesothelioma latency has been reported to average 48.7 years, in a range of {14, 72} years. There is wide variability in latency due to fiber type, intensity and exposure duration.¹⁵

Mesothelioma is well established as an occupational disease with a clear dose-response when it occurs in workers with long-term inhalation of high levels of amphibole asbestos fibers that are

Fischbein, A., A.M. Langer, Y. Suzuki and I.J. Selikoff: "Carcinoma of the Lung in a Drywall Taping Worker, Report of a Case." *Toxicology Letters*, 2:231-232 (1978). Figure 4 is a TEM photo of debris from the diseased lung showing that all fibers were shorter than 1 μ m and that there were many fragments of sheet silicates including clay and mica.

¹²Verma, D.K., and C.G. Middleton: "Occupational Exposure to Asbestos in the Drywall Taping Process," *AIHAJ* 41(4): 264-269 (1980).

¹³Ottoboni, M.A.: *The Dose makes the Poison – A Plain Language Guide to Toxicology*, 2nd Ed." (1991) Van Nostrand Reinhold, NY.

¹⁴Latency is the delay between the start of exposure and symptoms. For mesothelioma risk estimates, the effective latency is 10 years shorter than the number of years since the start of exposure in each engagement.

¹⁵Pistolesi, M., and J. Rusthoven: "Malignant Pleural Mesothelioma – Update, Current Management, and Newer Therapeutic Strategies." *Chest* 126:1318-1329 (2004).

longer than 10 μm with diameters smaller than 0.4 μm .¹⁶ Cohorts exposed to serpentine asbestos show no elevation of mesothelioma incidence rates at exposure-doses up to 1000 [f yr/mL].¹⁷ In cohorts with exposure to mixed fiber types, lung fiber burdens show that mesothelioma incidence rates correlate well with long fiber amphibole exposure-doses.¹⁸ The mesothelioma incidence rates are highest in cohorts with the highest amphibole exposure-doses and are lowest in those with exposure-doses near those associated with lifetime background fiber levels.¹⁹

The cohort of 17,800 union insulators in the US and Canada is the largest asbestos-exposed cohort with elevated mesothelioma rates. Insulators' lifetime average (LTA) exposure intensity was in the range, {4, 12} [f/mL], putting their 50-year lifetime exposure-doses in the range, {200, 600} [f yr/mL].²⁰ EPA estimated typical exposure-doses among asbestos mesothelioma cases to have been 375 [f yr/mL],²¹ well within Dr Selikoff's earlier estimate.

In 1970, 80% of all diagnosed Canadian mesothelioma cases, and 98% of the cases diagnosed in women, had no plausible asbestos exposures.²² In 2001, the ACGIH TLV committee concluded that at least 15% of mesothelioma cases were idiopathic.²³ By 2004, Roggli et al²⁴ reported: "In our own studies, approximately 11% of mesotheliomas have a lung asbestos content indistinguishable from background, and perhaps 10 to 20% of all cases are not the result of asbestos exposure." The authors noted that the predominant fiber type identified in patients with mesothelioma is commercial amphibole, and that in the United States amosite is ~20x more likely than crocidolite. Data published in 2006 suggest that the proportion of mesothelioma cases with asbestos exposure continues to fall and that mesothelioma was idiopathic (not asbestos

¹⁶Berman, D.W. and K.S. Crump: "Final Draft, Technical Support Document for a Protocol to Assess Asbestos-Related Risk," prepared for EPA Office of Solid Waste and Emergency Response, (Oct 2003) EPA # 9345.4-06.
Hodgson, J., and A. Damton: "The Quantitative Risks of Mesothelioma and Lung Cancer in Relation to Asbestos Exposure." *Ann Occup Hyg* 44(8):565-601 (2000).
Lanphear, B.P., and C.R. Buncher: "Latent Period for Malignant Mesothelioma of Occupational Origin." *J Occ Med* 34(7): 718-721 (1992).
Price, B., and A. Ware: "Mesothelioma: Risk Apportionment Among Asbestos Exposure Sources." *Risk Analysis* 25(4):937-943 (Aug 2005).
Yarborough CM. "Chrysotile as a Cause of Mesothelioma: An Assessment Based on Epidemiology" *Critical Reviews in Toxicology* 36:165-187 (2006).
And other papers referenced in the cited publications.

¹⁷Documentation of the TLVs and BEIs. ACGIH, Cincinnati, OH (2001).
Liddell, F.D., A.D. McDonald and J.C. McDonald: "Dust Exposure and Lung Cancer in Quebec Chrysotile Miners and Millers." *Ann Occup Hyg* 42(1):7-20 (1998).

¹⁸Ross, M.: "The Geologic Occurrences and Health Hazards of Amphibole and Serpentine Asbestos." In *Reviews in Mineralogy, Volume 9A: Amphiboles and Other Hydrous Pyriboles—Mineralogy* (Ed. D. R. Veblen). Washington, DC: Mineralogical Society of America, pp. 279-323 (1981).

¹⁹Dunnigan, Jacques: "Linking Chrysotile Asbestos with Mesothelioma" *Am J Ind Med* 14: 205-209 (1988).

²⁰Selikoff, I.J., E.C. Hammond and H. Seidman: "Mortality Experience of Insulation Workers in the United States and Canada, 1943-1976." *Ann NY Acad. Sci* 330:91-116 (1979).

²¹US EPA Integrated Risk Information System, ASBESTOS (CASRN 1332-21-4), <http://www.epa.gov/iris/subst/0371.htm>, section II.C.2 "Dose Response Data for Carcinogenicity, Inhalation Exposure." last revised: 1 Jul 1993.

²²McDonald, A.D., A. Harper, O.A. ElAltar, and J.C. McDonald: "Epidemiology of Primary Malignant Mesothelioma Tumors in Canada." *Cancer* 26(4): 914-919 (Oct 1970).

²³Documentation of the TLVs and BEIs. Asbestos TLV (2001) ACGIH, Cincinnati, OH.

²⁴Roggli, V.L., T.D. Oury & T.A. Sporn: *Pathology of Asbestos-Associated Diseases*, 2nd Ed. 2004; Springer-Verlag, NY; pp 108, 325.

related) in ~ 13% of male and ~ 60% of female patients.²⁵ In studies of neighborhood and carry-home exposures, living near an asbestos plant carries higher risk than living with an asbestos worker.²⁶

People with ambient exposures have exposure-doses below the threshold for mesothelioma. Because women in the US seldom worked with asbestos, the fact that there has been no increase in mesothelioma incidence in women during the period of rapid increase among men (1977-2004), shows that a threshold exists and that it is above the mid 20th century urban exposure-doses.²⁷ Although this threshold exposure intensity for primarily chrysotile asbestos is unknowable, it clearly lies below the range of intensities observed in insulators. That puts it in the range, {0.2, 2} [f/mL], with 50-year exposure-doses in the range, {10, 100} [f yr/mL].

It is important for an industrial hygienist to understand that mesothelioma is a disease whose risk increases in populations with high occupational exposures to long, thin amphibole fibers and that its risk is greater than zero in populations with no occupational exposure to asbestos. For individuals or groups with low exposure-doses, it is not possible to "say with certainty that the cancer would not have occurred if the person had not been exposed to the carcinogen."²⁸ In other words, it is impossible to say with reasonable scientific certainty that a near threshold exposure-dose is associated with mesothelioma. Further, because no more than 10-20 % of the most exposed populations contract the disease,²⁹ the best anyone can do is to provide a probability that the disease in any circumstance is asbestos-related, based on the work history and the estimated exposure pattern. The term *risk* quantifies that probability and is central to selection of industrial hygiene exposure control measures.

Mr Helfand's Work History

The following sequence represents a partial record of Mr Helfand's work history. It is based on Mr Helfand's testimony with dates refined from review of his social security records. There is no attempt to capture all of the short engagements shown in his social security records.

Rabin Typesetting, 1952 (SS records show ~ 1 mo, while in High School).
United Offset printing,³⁰ 1953 - 1957 (learned press maintenance on night shift)

²⁵Roggli, VL.: "The Role of Analytical SEM in the Determination of Causation in Malignant Mesothelioma." *Ultrastructural Pathology* 30:31-35 (2006).

²⁶Magnani, C., P Dalmasso, A Biggeri, C Ivaldi, D Mirabelli, B Terracini. "Increased Risk of Malignant Mesothelioma of the Pleura after Residential or Domestic Exposure to Asbestos: A Case-Control Study in Casale Monferrato, Italy." *Environ Health Perspectives* 109(9):915-919 (Sep 2001).

²⁷Price, B.: "Analysis of Current Trends in United States Mesothelioma Incidence." *Am J Epidemiol* 145(3):211-218 (1997).

²⁸Cember, Herman: *Introduction to Health Physics*, 3rd ed, McGraw-Hill NY, pp 233-237(1996).

²⁹Talcott, J.A., W.A. Thurber, A.F. Kantor, E.A. Gaensler, J.F. Danahy, K.H. Antman, and F.P. Li. "Asbestos-Associated Diseases in a Cohort of Cigarette-Filter Workers." *New England Journal of Medicine* pp 1220-1223 (1989)

Talcott et al found 5 of 28 former crocidolite filter workers died of mesothelioma, ~18% ... all had diagnosed asbestos related disease ... workplace exposure intensity was reported to be ~ 80 f/mL of crocidolite, whose use ceased in 1971. The kent micronite filters were manufactured with a uniquely dusty dry process that deposited blended crocidolite, cotton, acetate fibers on crepe paper and rolled it to prepare the filter.

³⁰Deposition of Harvey Helfand, Vol III, 3/09/07, p 280.

Ramapo as a pressman,³¹ 1957-1961, 1971 (~ 1 mo)
 Fenway Press,³² 1961 (~ 4mo)
 Knight Litho or Muree Press,³³ 1961-1966
 Majestic Graphic Press,³⁴ 1966 (~4 mo)
 Lorsten Press aka Service Offset,³⁵ 1966-1967
 Marshall Typography,³⁶ 1967 (1- 2 mo) \hookleftarrow
 Deblin Manufacturing,³⁷ 1967 (~ 1 mo), brother's die extrusion company
 Jarrett Press Inc,³⁸ 1968 (~ 4 mo)
 Ross Printing Co,³⁹ 1968 (~ 5 mo)
 Triple M Printing,⁴⁰ 1969-70 (~ 6 mo as foreman)
 Lithocraft Corp,⁴¹ 1970 (~7 mo)
 Self Employment, 1971-1972
 H&H Multicolor Corp, 1973-1991 (maintained his own presses)
 Park Lane Litho, 1992 (~ 2 mo)
 Spectrum Printing & Lithography,⁴² 1993- 2005 (time off in winter 97-98)
 Colahan Saunders Corp, 1997 (~5 wk, overhauled an old press for them)
 30% home improvement off the books (> 50 projects) and 70% printing and press repair⁴³
 80% of home improvement projects included joint compound.⁴⁴
 Mr Helfand started flying in 1979 and did much of the maintenance on his Piper Dakota.⁴⁵

Discussion of Potential Asbestos Exposure

Mr Helfand smoked cigarettes at 1 ppd from age 15 to ~ age 45 (approximately 1950 - 1980), shifting to filtered cigarettes when they became available.⁴⁶ He testified that he smoked Kent filtered cigarettes during the 1950s and that he remembered the phrase, Micronite filter. For 5 to 6 years, these filters each contained ~10 mg of long-fiber crocidolite asbestos, upwards of 80 billion fibers with diameters < 0.1 μ m. It has been estimated that a 1 ppd smoker inhaled 131

³¹Deposition of Harvey Helfand, Vol III, 3/09/07, p 280, 294

³²Deposition of Harvey Helfand, Vol III, 3/09/07, p 287

³³Deposition of Harvey Helfand, Vol III, 3/09/07, p 289-90

³⁴Deposition of Harvey Helfand, Vol III, 3/09/07, p 291

³⁵Deposition of Harvey Helfand, Vol III, 3/09/07, p 291-292

³⁶Deposition of Harvey Helfand, Vol III, 3/09/07, p 292

³⁷Deposition of Harvey Helfand, Vol III, 3/09/07, p 293

³⁸Deposition of Harvey Helfand, Vol III, 3/09/07, p 293

³⁹Deposition of Harvey Helfand, Vol III, 3/09/07, p 295-297

⁴⁰Deposition of Harvey Helfand, Vol III, 3/09/07, p 297-298

⁴¹Deposition of Harvey Helfand, Vol III, 3/09/07, p 299-300

⁴²Deposition of Harvey Helfand, Vol III, 3/09/07, p 267-272, 278

⁴³Deposition of Harvey Helfand, Vol III, 3/09/07, p 350-52

⁴⁴Deposition of Harvey Helfand, Vol III, 3/09/07, p 374

⁴⁵Deposition of Harvey Helfand, Vol III, 3/09/07, p 389-394

⁴⁶Deposition of Harvey Helfand, Vol II, 1/29/07, p 161-2.

million NIOSH fibers per year.⁴⁷ Smoker exposure has been established by quantifying long crocidolite fibers in the lungs and lymph nodes of a Kent smoker who died of mesothelioma with no other known asbestos exposure.⁴⁸ Mr Helfand's testimony supports the conclusion that he inhaled many hundreds of millions of crocidolite fibers while smoking Kent cigarettes, a substantial and sufficient contributing factor to his risk of mesothelioma.

Mr Helfand's career in the printing business started as a 15-year old, when he worked part-time at Rabin Typographers. SS records suggest ~ 1 month part-time, but he testified to 5 or more hours per day for nearly a year. Mr Helfand claims asbestos dust from insulation on pots and while cutting flooring.⁴⁹ He stated that he regularly cleaned the Linotype machine; he recalled lead melted in gas fired pots that he thinks were lined with asbestos, pots he cleaned.⁵⁰ When type alloy is melted, the tin and antimony tend to oxidize to a white powder that is removed from each batch and replaced with fresh metal. The pots must be cleaned to remove the undesired oxide powders, and this was likely part of his daily job. The pot lining had to be changed occasionally, but said he did not do that job, he watched others as they smoothed the paste on the outside of the pot with a spatula.⁵¹

After he graduated from the New York School of Printing in 1953 at approximately age 18, he worked full time for numerous printing companies, including an 18- to 22-yr period (1970 or 1973 to 1992) when he ran his own company, H&H Multicolor. Mr Helfand says that if he was exposed to asbestos, it was from the clutches and brakes on the presses.⁵²

Mr Helfand testified that during lapses in his regular employment he did part-time residential renovations and most involved tearing out old materials prior to the new construction.⁵³ Over the course of his career, he spent 70% of his working hours at printing related jobs and 30% in renovation and he estimated that he completed about 50 projects between 1955 and 2005.⁵⁴ He noted that 80% of his home renovation projects involved some joint compound.⁵⁵ He recalled two periods dedicated to residential projects: 2 consecutive years between 1967-1969,⁵⁶ and 6 months during the late 1990s.⁵⁷ His Social Security records show that he had some income from

⁴⁷Longo, W.E., M.W. Rigler and J. Slade: "Crocidolite Asbestos Fibers in Smoke from Original Kent Cigarettes." *Cancer Research* 55: 2232-2235 (1jun95).

⁴⁸Dodson, R.F., and S.P. Hammar: "Pleural Mesothelioma in a Woman Whose Documented Past Exposure to Asbestos was From Smoking Asbestos-Containing Filtered Cigarettes: The Comparative Value of Analytical Transmission Electron Microscopic Analysis of Lung and Lymph-Node Tissue." *Inhalation Toxicology* 18:679-684 (2006).

⁴⁹Deposition of Harvey Helfand, Vol III, 3/09/07, pp 397-408.

⁵⁰Deposition of Harvey Helfand, Vol I, 1/22/07, pp 90-96. [Note that the melting point of lead is 327.5 °C (600.65 K, 621.5 °F), and the melting point of alloys used in linotype machines was lower, as low as the lead-tin eutectic alloy (62% tin, 38% lead), 183 °C. Other alloys with lead, tin and antimony had intermediate melting points. Lead and these alloys are commonly melted in cast iron pots. The purpose of the alleged asbestos lining is not clear. Nevertheless, an asbestos exposure will be assigned in dose reconstruction to avoid underestimating lifetime asbestos exposure.]

⁵¹Deposition of Harvey Helfand, Vol II, 1/29/07, p 189.

⁵²Deposition of Harvey Helfand, Vol III, 3/09/07, p 273.

⁵³Deposition of Harvey Helfand, Vol II, 1/29/07, p 152 is but one example of this repeated testimony.

⁵⁴Deposition of Harvey Helfand, Vol III, 3/9/07 pp 351-352, 378.

⁵⁵Deposition of Harvey Helfand, Vol III, 3/09/07, p 374.

⁵⁶Deposition of Harvey Helfand, Vol II, 1/29/07, pp 197-201.

⁵⁷Deposition of Harvey Helfand, Vol II, 1/29/07, pp 199-200.

7 employers during 10 quarters of the 3-year period between 1967 and 1969, and show a reduction in reported income during the 1997-98 period. It was during these periods that he had time to complete two to three projects per year.⁵⁸ In fact, he testified that he completed two basements with bathrooms during the 1967-69 period, using both sheetrock and paneling; he does not know which brand of joint compound he used on either of these 2-month projects.⁵⁹ Mr Helfand recalled using Bestwall, US Gypsum, Kaiser, and Georgia-Pacific drymix joint compounds, shifting to premix Bestwall, US Gypsum and Kaiser when they became available.⁶⁰ He stated that he used GP dry mix 4-5x a year, beginning in 1953 to 1955,⁶¹ and that he switched to readymix as soon as GP introduced it to the market. GP did not sell joint compound until after it acquired Bestwall in 1965, and did not drop the Bestwall label until the late 1960s, so he did not see the GP joint compound label in the early 1950s; further, Bestwall was not organized as a company and did not manufacture joint compound until 1956, so he did not see Bestwall during the period 1953-55.⁶²

Mr Helfand's Answers to Interrogatories stated that he was unaware of any non-occupational exposure to asbestos.⁶³ Nevertheless, he detailed non-occupational asbestos exposure while renovating/repairing his family's homes.

1) 9802 Foster Ave (childhood home, 1935- early 1950s) – Helfand testified that he and his brother handled the asbestos cement around the boiler as well as the associated pipecovering when they worked on the boiler.⁶⁴

2) 634 Schenectady Ave (early 1950s to 1958) – Young Helfand helped his father put an apartment in the basement, using Kentile flooring, sheetrock and plaster. The basement was ~15'x35' and the project took about 6 months.⁶⁵ He named USG plaster as the compound.⁶⁶

3) 227 E 86th St, Brooklyn (1958-1960) – He claimed no asbestos exposure.

4) 1127 E 83rd St (1960-1963) – He claimed no asbestos exposure during minor maintenance he performed for his elderly landlords.

5) 1151 E 82nd St (1963-1998) – Helfand testified that he could have been exposed to asbestos from products he used in the basement renovation, extra bathroom, and reinsulation of the back wall.⁶⁷ The basement (15' x 20') project took 6 months of sporadic time in the mid 1960s; he wired it for electricity, put up walls, and added a bathroom. He used Celotex drop ceilings,

⁵⁸Deposition of Harvey Helfand, Vol II, 1/29/07, pp 199-202.

⁵⁹Deposition of Harvey Helfand, Vol III, 3/09/07, pp 349-351.

⁶⁰Deposition of Harvey Helfand, Vol III, 3/09/07, p 337.

⁶¹Deposition of Harvey Helfand, Vol III, 3/09/07, pp 329-330, 336.

⁶²GP Response to Master Interrogatories, 3rd Judicial Circuit, Madison County, IL; Affidavit of O.E. Burch 14 Jan 03.

⁶³Plaintiff's Responses to Defendant's 4th Amended Interrogatories and RFP, 17 Nov 2006, p 13, sec 20A.

⁶⁴Deposition of Harvey Helfand, Vol I, 1/22/07, pp 58-59; Vol III, 3/09/07, p 396.

⁶⁵Deposition of Harvey Helfand, Vol I, 1/22/07, pp 54-57; Vol II, 1/29/07, pp 240-245.

⁶⁶Deposition of Harvey Helfand, Vol I, 1/22/07, p 43.

⁶⁷Deposition of Harvey Helfand, Vol I, 1/22/07, pp 38-47; Vol II, 1/29/07, pp 237-239..

Kentile floor tiles, and US Gypsum joint compound packaged as ready mix paste.⁶⁸ Reinsulation of the back wall occurred in the mid 1970s and he claimed asbestos exposure to sheetrock and spackling compound.⁶⁹ He remodeled the kitchen in 1985 (15 years before he moved),⁷⁰ long after manufacturers removed asbestos from their joint compound formulations.

Estimating Exposure-dose and Mesothelioma Risk

A lifetime exposure-dose estimate is the product of duration and intensity.⁷¹

Duration is in working years [1 year = 50 weeks = 250 days = 2000 hours].

Intensity is the breathing-zone average concentration in [fibers/mL = f/mL].

Exposure-dose units are [(fiber/mL) *(years) = f yr/mL].

The *mesothelioma risk* [mesothelioma cases per million people exposed] from asbestos exposure has been shown⁷² to be proportional to intensity of exposure (*in*), to potency for each fiber type (*km*) and to the difference between the positive definite cube of latency minus ten years (*la - 10*)³, and the positive definite cube of latency minus duration minus 10 years (*la - du - 10*)³. The unit step function in the equation assures positive risk for all realistic values of input parameters.⁷³

$$risk[in, du, la, km] = \frac{in \cdot km}{10,000} ((la - 10)^3 U[la - 10] - (la - du - 10)^3 U[la - du - 10])$$

The duration, exposure-dose and mesothelioma risk for key portions of Mr Helfand's lifetime asbestos exposure history are displayed in Table 1,⁷⁴ dramatically illustrating the de minimus nature of his alleged exposure to asbestos-containing joint compound. Testimony identified joint compounds from Bestwall, GP, Kaiser and USG without assigning proportions. GP joint compound was not available for purchase prior to the late 1960s, so the home renovation projects in the 1950s could not have used GP joint compound. Only after the mid '60s and ending not later than 1978, could Mr Helfand have used GP joint compound with asbestos, about 25% of the 50 years he said he worked in residential renovation, and about 50% of the years when short fiber chrysotile asbestos was part of the joint compound formulations from all vendors. It follows that, of the asbestos associated with joint compound, no more than 8 to 12% was GP, and 88 to 92% was from the other named brands.⁷⁵ Because Mr Helfand was not able to enumerate all of his projects and assign a brand to each, the total dose associated with his joint compound use is estimated in Table 1. Each named defendant is responsible for less.

⁶⁸Deposition of Harvey Helfand, Vol III, 3/09/07, pp 369-370.

⁶⁹Video Deposition of Harvey Helfand, 3/11/07, p 45.

⁷⁰Deposition of Harvey Helfand, 1/22/07, pp 47-48.

⁷¹Seidman H., I.J. Selikoff, S.K. Gelb: "Mortality Experience of Amosite Asbestos Factory Workers: Dose-response Relationships 5 to 40 Years after Onset of Short-term Work Exposure." *Am J Ind Med* 10:479-514 (1986).

⁷²Peto, Seidman and Selikoff: "Mesothelioma Mortality in Asbestos Workers Implications for Models of Carcinogenesis and Risk Assessment." *Br J Cancer* 45:124-135 (1982).

Peto, J., R. Doll, C. Hermon, W. Binns, R. Clayton and T. Goffe: "Relationship of Mortality to Measures of Environmental Asbestos Pollution in an Asbestos Textile Factory." *Ann Occ Hyg* 29(3):305-355 (1985).
Hodgson and Darnton (2000), Berman and Crump (2003), Price and Ware (2005).

⁷³The Unit Step Function, $U[x] = 0$ for $x < 0$ and 1 for $x > 0$.

⁷⁴Note that when two entries sit atop one another in the table, that represents the range estimated for that entry.

⁷⁵GP fraction = (frac of yrs) (frac of projects) (GP frac of brands) = 0.5 0.8 (0.2, 0.3) = {0.08, 0.12}

Table 1: Duration, Exposure-dose and Mesothelioma Risk

Source [Units]	Dur [years]	DurRange [years]	ExpDos [f*yr/mL]	EDRange [f*yr/mL]	MesoRisk [#/Million]	MRRange [#/Million]
US Gypsum	0.006	0.003 0.012	0.018	0.0063 0.054	0.0017	0.00016 0.019
All Joint Compound	0.081	0.025 0.27	0.16	0.034 0.77	0.024	0.002 0.3
Childhood	0.016	0.008 0.032	0.01	0.0029 0.035	0.051	0.0021 1.2
Environmental	71.	71. 71.	2.8	0.89 9.	2.8	0.28 28.
Partial Occupational	67.	64. 70.	11.	5.2 22.	23.	1.7 310.
Kent Cigarettes	2.8	2. 4.	0.2	0.1 0.4	30.	5.8 150.
Lifetime Total	71.	71. 71.	14.	6.2 32.	62.	7.8 490.

Table 2 compares the joint compound exposure estimates with recognized exposure benchmarks. Mr Helfand's duration attributed to GP was de minimus compared either to a nominal 40-year career, or to his own 50-year career. His total joint compound exposure-dose was very small compared with the non-potent exposure-dose experienced by many middle 20th century urban residents, and an even smaller fraction of the 375 [f yr/mL] typical exposure-dose among asbestos-associated mesotheliomas. His overstated joint compound attributable exposure is so small that the mesothelioma risk model predicts only one attributable mesothelioma case among 41 million people with his exposure, in a range of {3.3, 510.} million people. That case would not be distinguishable from the 410 idiopathic cases, in a range of {33, 5100} cases, expected in the same population. No more than {8%, 16%} of that risk is reasonably attributed to GP.

Table 2: Estimated Effect Relative to Exposure and Risk Benchmarks

<u>All Joint Compound</u>	<u>Ratio</u>	<u>Range</u>	<u>RefQuantity</u>
Duration as Fraction of 40 yr Career	0.002	0.00062 0.0067	40 yr
Fraction of Typical Mesothelioma Exposure Dose	0.00043	0.00009 0.002	375 f yr/mL
Fraction of Idiopathic Meso Rate	0.0024	0.0002 0.03	10/Million
Population So Exposed for 1 Extra Mesothelioma	41. million	3.3 million 510. million	1 meso
Number Idiopathic Mesos in this Population	410.	33. 5100.	---

Summary of Quantitative Risk Factors

Mr. Helfand's exposure-dose to chrysotile fibers in dust from all brands of joint compound is negligible when compared with mesothelioma-free chrysotile-exposed cohorts:

- career chrysotile workers (intensities to 20 f/mL) had exposure-doses to 1000 [f yr/mL];
- career tapers (intensities up to 4.5 f/mL) had exposure-doses to 225 [f yr/mL];
- 20th century urban residents had environmental exposure-doses to [10 f yr/mL] or more;
- his estimated joint compound associated mesothelioma risk is de minimus compared with the idiopathic background rate of 10 per million men in the United States;
- his GP attributable exposure dose and mesothelioma risk, if any, are inconsequential.

Summary of Qualitative⁷⁶ Risk Factors

It is more likely than not that Mr. Helfand's exposure to chrysotile fibers in dust from joint compounds did not put him in a cohort with risk of mesothelioma because:

- the short fibers in joint compound are not potent for mesothelioma in humans;
- there is no report of excess mesothelioma in any cohort of full-time drywall tapers;
- an occasional user is at much lower risk than the de minimus risk of full-time tapers;
- his attributable joint compound exposure-dose and mesothelioma risk are negligible.

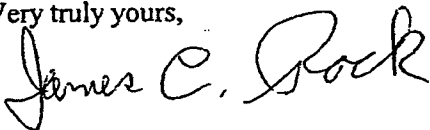
Conclusions

Based on case-specific materials, peer reviewed reports and, to a reasonable degree of scientific certainty, I conclude that:

1. Mr. Helfand's attributable lifetime exposure-dose to asbestos fibers from all wall finishing compounds was much smaller than the natural background exposure-dose to asbestos fibers experienced by many urban residents during his lifetime.
2. His infrequent and remarkably small exposures to asbestos fibers from joint compound dust put him in a cohort where the attributable asbestos-associated mesothelioma risk is negligible – vanishingly smaller than the observed idiopathic rate for men in the USA.
3. It is far more likely than not that Mr. Helfand's even smaller asbestos exposure-dose attributed to Georgia-Pacific, if any, did not put him in a cohort with elevated risk of mesothelioma.

I reserve the right to amend or supplement this report if additional case-specific information becomes available for my review. Please let me know if I can be of further assistance.

Very truly yours,



James C. Rock, PhD, PE, CIH

Attachment: Appendix A. Representative Lifetime Exposure-Doses

⁷⁶Qualitative here means interpreting the present case in terms of non-mathematical trends apparent from epidemiology; it contrasts with quantitative estimates of rates and risk that lie at the core of modern industrial hygiene.

Appendix A. Representative Lifetime Exposure-Doses

	Reference	Standard ⁷⁷ [fiber/mL]	Concentration [fiber/mL]	Lifetime Exposure-Dose [fiber years/mL]
Mixed Fiber Exposures	1951-1971 TLV ⁷⁸	30		1500*
	Dec 1971 PEL	5		250*
	Jul 1976 PEL	2		100*
	high urban background, 20 th century ⁷⁹		0.03	10.**
	Aug 1994 - current PEL	0.1		5*
With Meso	Mt Sinai insulators, elevated meso risk ⁸⁰		4-12	200-600*
	EPA 1991 Summary of meso cases ⁸¹		7.5*	375
Chrysotile Exposures Meso rates not elevated	Quebec Miner/Miller Cohort ⁸²		~ 20	1000
	full time drywallers ⁸³		2.1 - 4.5	105 - 225*
	high natural background ⁸⁴		0.01	3.4**
	low natural background/indoor		< 0.001	< 0.34**
*Based on a 50-yr working life time, **Based on an 80-year life time				

Note: Micronite filter workers with mesothelioma had worked for 0.7 to 4 years with crocidolite fibers at a concentration of 80 f/mL, and had exposure doses in the range 56 to 320 f yr/mL with latencies in the range of 20 to 30 years.⁸⁵

⁷⁷Martonek, J.F., E. Nash and E. Grossman: "The History of OSHA's Asbestos Rulemakings and some Distinctive Approaches That They Introduced for Regulating Occupational Exposure to Toxic Substances." *AIHAJ* 62:208-217 (2001).

⁷⁸OSHA PEL for Asbestos is found in "The Asbestos Standard for General Industry." 29 CFR 1910.1001(k)(7).

⁷⁹International Programme on Chemical Safety, Environmental Health Criteria 53, "ASBESTOS AND OTHER NATURAL MINERAL FIBRES" Published under the joint sponsorship of the United Nations Environment Programme, the International Labour Organisation, and the World Health Organization World Health Organization Geneva, 1986. Section 1.1.3

⁸⁰Selikoff, I.J., E.C. Hammond and H. Seidman: "Mortality Experience of Insulation Workers in the United States and Canada, 1943-1976." *Ann. N.Y. Acad. Sci.* 330:91-116 (1979).

⁸¹US EPA Integrated Risk Information System, ASBESTOS (CASRN 1332-21-4), <http://www.epa.gov/iris/subst/0371.htm>, section II.C.2 "Dose Response Data for Carcinogenicity, Inhalation Exposure." Carcinogenicity Assessment last revised: 1Jul93.

⁸²Liddell, F.D., A.D. McDonald and J.C. McDonald: "Dust Exposure and Lung Cancer in Quebec Chrysotile Miners and Millers." *Ann Occup Hyg* 42(1):7-20 (1998).

⁸³Verma, D.K., and C.G. Middleton: "Occupational Exposure to Asbestos in the Drywall Taping Process." *AIHAJ* 41(4): 264-269 (1980).

⁸⁴Klein, Cornelius: "Asbestos: Mineralogy and Misunderstanding." Twelfth Annual New Mexico Mineral Symposium, NM Institute of Mining and Technology, Socorro, NM (9-10 Nov 1991).

⁸⁵Talbot, J.A., W.A. Thurber, A.F. Kantor, E.A. Gaensler, J.F. Danahy, K.H. Antman, and F.P. Li. "Asbestos-Associated Diseases in a Cohort of Cigarette-Filter Workers." *New England Journal of Medicine* pp 1220-1223 (1989).